National Institute of Environmental Health Sciences

Climate change impacts and adaptation in cities: a review of the literature

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Year: 2011
Journal: Climatic Change. 104 (1): 13-49

Abstract:

Many of the decisions relating to future urban development require information on climate change risks to cities This review of the academic and "grey" literature provides an overview assessment of the state of the art in the quantification and valuation of climate risks at the city-scale. We find that whilst a small number of cities, mostly in OECD countries, have derived quantitative estimates of the costs of climate change risks under alternative scenarios, this form of analysis is in its infancy. The climate risks most frequently addressed in existing studies are associated with sea-level rise, health and water resources. Other sectors such as energy, transport, and built infrastructure remain less studied. The review has also undertaken a case study to examine the progress in two cities-London and New York-which are relatively advanced in the assessment of climate risks and adaptation. The case studies show that these cities have benefited from stakeholder engagement at an early stage in their risk assessments. They have also benefited from the development of specific institutional responsibilities for co-ordinating such research from the outset. This involvement has been critical in creating momentum and obtaining resources for subsequent in-depth analysis of sectoral impacts and adaptation needs..While low cost climate down-scaling applications would be useful in future research, the greatest priority is to develop responses that can work within the high future uncertainty of future climate change, to build resilience and maintain flexibility. This can best be used within the context of established risk management practices.

Source: http://dx.doi.org/10.1007/s10584-010-9975-6

Resource Description

Climate Scenario : ☒

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2, SRES B2

Early Warning System: ☒

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☒

weather or climate related pathway by which climate change affects health

Air Pollution, Ecosystem Changes, Extreme Weather Event, Food/Water Quality, Food/Water Security, Food/Water Security, Precipitation, Sea Level Rise, Temperature

Air Pollution: Ozone

Extreme Weather Event: Drought, Flooding, Hurricanes/Cyclones, Landslides

Food/Water Security: Food Access/Distribution

Temperature: Extreme Heat, Fluctuations

Geographic Feature: ☑

resource focuses on specific type of geography

Desert, Freshwater, Ocean/Coastal, Urban, Other Geographical Feature

Other Geographical Feature : Riverine locations

Geographic Location: ☑

resource focuses on specific location

Global or Unspecified

Health Co-Benefit/Co–Harm (Adaption/Mitigation): ☑

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease, Mental Health/Stress, Morbidity/Mortality, Respiratory Effect, Other Health Impact

Infectious Disease: Foodborne/Waterborne Disease, Vectorborne Disease

Foodborne/Waterborne Disease: General Foodborne/Waterborne Disease, Salmonellosis

Vectorborne Disease: General Vectorborne

Mental Health Effect/Stress: Mood Disorder, Stress Disorder

Respiratory Effect: Asthma

Other Health Impact: Hospital admissions; Well-being

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Cost/Economic, Exposure Change Prediction, Methodology

Population of Concern: A focus of content

Resource Type: ☑

format or standard characteristic of resource

Policy/Opinion, Research Article

Resilience: ☑

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale: ☑

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content